



30 minutes



Grades
6–8, 9–12

Core Sampling

Extract a core sample to see what lies below the surface of the earth.



Instructions

Students create their own layers of “earth” and then take core samples to see how such sampling gives scientists an accurate picture of what lies below the surface.

1 Ask students if they know what a core sample is, and what core sampling can be used for. Make sure the students grasp that a core sample is a small, cylindrical section of something—typically a naturally occurring substance like earth. The sample can be analyzed to determine things such as:

- How porous or permeable the substance is (how easy it is for air or liquid to pass through)
- Whether there is fluid in it, such as water
- How old the substance is
- Whether it’s likely that there is oil there

Materials

PER CLASS:

- 1 bag of dark sand
- 1 bag of light sand
- 1 bag of soil
- 1 bag of small gravel (e.g., aquarium gravel)
- Spray bottles with water

PER STUDENT OR TEAM:

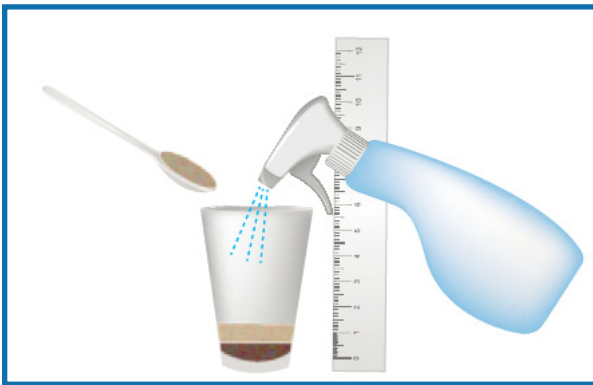
- 1 clear plastic cup (8 oz.)
- 1 clear plastic straw
- 1 plastic spoon
- Metric ruler

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2 Pass out materials and instruct students to do the following:

- Using the ruler to measure, add a 1 cm layer of one of the earth materials (dark or light sand, soil, or gravel) to the cup. Mist with spray bottle of water until damp, but don't soak.
- Place another earth material 1 cm deep on top of the first layer. Moisten with water until damp.
- Continue alternating layers of earth materials and water, in any order you choose. The layers should be a total of 4 cm deep in the cup.
- Use a straw to extract a core sample by pushing the straw straight down through the layers of the cup.
- Place your finger tightly over the top end of the straw and withdraw it from the cup. Observe the layers in the straw core sample.

3 When all students are finished, lay several core samples from different cups side by side. Compare and discuss the results.



Engineering & Science Connections

- 🔗 Core sampling is one way that geotechnical engineers determine the geologic formation of rocks and sediments when exploring for oil, coal, gas, and precious metals. Scientists also take core samples of ice sheets and permafrost (permanently frozen ground) to measure climate changes over time.
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- 🔗 To get the geologic information needed, core samples may be taken miles down into the earth. When core sampling this deep, drill bits are often used to churn and break up rock in the sampling path, because it's the only way to move through a solid rock layer. The deepest core samples on earth have been produced at the Kola Superdeep Borehole in Russia, which reached over 40,000 feet (7.5 miles) into the earth.
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- 🔗 Core samples are also used to analyze the characteristics of soil at construction sites. In order to design a proper foundation for any structure, a structural engineer needs to know certain qualities of the earth underneath it, such as soil strength, water content, contamination, and compaction.

Guiding Questions ?

Which materials are easy to push the straw through? Which are difficult?

What are some ways to push through the hard substances, like the gravel?

What happens if you wiggle the straw when you insert it into the sample? Or if you insert it at an angle? Do you get an accurate picture of your cup's layers?

Activity courtesy of Energy4me.